Cont. a1

[On page 8, please delete the paragraph at line 13 and replace with the following paragraph:]

a1

Figures 5A-5E illustrate example signals with Gaussian pulses, according to one embodiment;

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TC 2600 MAIL ROOM

IN THE CLAIMS:

Please amend the claims as follows *(a marked up version of these claims are included in Attachment A)*:

a2

42. (Amended) The method of claim 40, wherein said generating a coarse estimate set of N parameters for the first modulated Gaussian pulse comprises:

a) determining a current area of interest of the received signal, wherein the current area of interest comprises a second sequence of values which includes at least a portion of the first sequence of values, and wherein the current area of interest comprises a start position and an end position;

b) selecting a current Gaussian window from a plurality of Gaussian windows, wherein the current Gaussian window comprises a third sequence of values representing a Gaussian waveform;

c) performing a windowed Fast Fourier Transform (FFT) using the selected Gaussian window and the determined area of interest to generate a power spectrum;

d) identifying a peak frequency amplitude from the power spectrum;

e) repeating a) through d) in an iterative manner until each of the plurality of Gaussian windows has been selected, thereby generating a plurality of peak frequency amplitudes;

f) identifying a maximum peak frequency amplitude from said plurality of peak frequency amplitudes; and

g) selecting an estimation Gaussian window from the plurality of Gaussian windows corresponding to said identified maximum peak frequency amplitude, wherein

Cont Q2

said coarse estimate set of N parameters of the Gaussian pulse is determined from the estimation Gaussian window.

46. (Amended) The method of claim 30, wherein said one or more reflected pulses are generated by the Device Under Test (DUT) reflecting at least a portion of the initial modulated Gaussian pulse; and

Q3

wherein said refined set of parameters characterizing the Gaussian pulse and the one or more reflected Gaussian pulses are useable to characterize a connection discontinuity in the DUT.

66. (Amended) The memory medium of claim 54, wherein said generating a coarse estimate set of N parameters for the first modulated Gaussian pulse comprises:

Q4

a) determining a current area of interest of the received signal, wherein the current area of interest comprises a second sequence of values which includes at least a portion of the first sequence of values, and wherein the current area of interest comprises a start position and an end position;

b) selecting a current Gaussian window from a plurality of Gaussian windows, wherein the current Gaussian window comprises a third sequence of values representing a Gaussian waveform;

c) performing a windowed Fast Fourier Transform (FFT) using the selected Gaussian window and the determined area of interest to generate a power spectrum;

d) identifying a peak frequency amplitude from the power spectrum;

e) repeating a) through d) in an iterative manner until each of the plurality of Gaussian windows has been selected, thereby generating a plurality of peak frequency amplitudes;

f) identifying a maximum peak frequency amplitude from said plurality of peak frequency amplitudes; and

g) selecting an estimation Gaussian window from the plurality of Gaussian windows corresponding to said identified maximum peak frequency amplitude, wherein said coarse estimate set of N parameters of the Gaussian pulse is determined from the estimation Gaussian window.

70. (Amended) The memory medium of claim 54, wherein said one or more reflected pulses are generated by the Device Under Test (DUT) reflecting at least a portion of the initial modulated Gaussian pulse; and

a5

wherein said refined set of parameters characterizing the Gaussian pulse and the one or more reflected Gaussian pulses are useable to characterize a connection discontinuity in the DUT.

Please add the following new claims:

77. (New) A method for performing Time Domain Reflectometry (TDR) on a device under test (DUT) using Gaussian pulses, the method comprising:

a6

receiving a signal, wherein the signal comprises a first sequence of values, and wherein the signal comprises an initial modulated Gaussian pulse and one or more reflected modulated Gaussian pulses;

characterizing a first modulated Gaussian pulse in the signal, wherein said characterizing the first modulated Gaussian pulse in the signal comprises:

generating a coarse estimate set of N parameters for the first modulated Gaussian pulse, wherein N is greater than or equal to one;

generating a plurality of permutations of the coarse estimate set of parameters, wherein said plurality of permutations of the coarse estimate set comprises a plurality of parameter sets, and wherein each parameter set corresponds to an estimation waveform; and

determining a refined set of N parameter values using the plurality of parameter sets, wherein the refined set of parameters characterizes the first modulated Gaussian pulse; and

analyzing the characterized first modulated Gaussian pulse to determine characteristics of the DUT.

78. (New) The method of claim 77,

wherein said determining a refined set of N parameter values using the plurality of parameter sets comprises:

generating a plurality of linear equations from the plurality of parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and at least a subset of the N parameter variables of the Gaussian pulse; and

Cont A6

determining the N parameter variables of the Gaussian pulse by solving the plurality of linear equations, wherein the determined parameters characterize the Gaussian pulse.

79. (New) The method of claim 78,

wherein said generating a plurality of permutations comprises generating M permutations of the estimation of the N parameters, and wherein the M permutations comprise M parameter sets corresponding to M estimation waveforms;

wherein said generating the plurality of linear equations comprises generating the plurality of linear equations from at least a subset of the M parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the Gaussian pulse;

wherein said determining the N parameter variables of the Gaussian pulse comprises solving the plurality of linear equations, wherein the determined parameters characterize the Gaussian pulse.

80. (New) The method of claim 79,

wherein said generating the plurality of linear equations comprises generating at least M linear equations from the M parameter sets.

81. (New) The method of claim 78, wherein said generating the plurality of linear equations from the plurality of parameter sets comprises:

generating a plurality of closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating the plurality of linear equations from the plurality of inner products, wherein each linear equation is a function of a respective one of the plurality of parameter sets and corresponding N parameter variables of the Gaussian pulse.

Cont. a6

82. (New) The method of claim 77,

wherein said generating a plurality of permutations comprises generating M permutations of the estimation of the N parameters, and wherein the M permutations and the estimation comprise M+1 parameter sets corresponding to M+1 estimation waveforms;

wherein said generating a plurality of linear equations comprises generating M+1 linear equations from the M+1 parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the Gaussian pulse;

wherein said determining the N parameter variables of the Gaussian pulse comprises solving the M+1 linear equations, wherein the determined parameters characterize the Gaussian pulse.

83. (New) The method of claim 82, wherein said generating M+1 linear equations from the M+1 parameter sets comprises:

generating M+1 closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating M+1 linear equations from the M+1 inner products, wherein each linear equation is a function of a respective one of the M+1 parameter sets and corresponding N parameter variables of the Gaussian pulse.

84. (New) The method of claim 83, wherein $M = N - 1$.

85. (New) The method of claim 82, wherein said determining a refined set of N parameter values using the plurality of parameter sets comprises:

generating M+1 linear equations from the M+1 parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the first modulated Gaussian pulse; and

determining values of the N parameter variables by solving the M+1 linear equations, wherein the determined parameter variables characterize the first modulated Gaussian pulse.

Cont. A6

86. (New) The method of claim 85, wherein said generating M+1 linear equations from the parameter sets comprises:

generating M+1 closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating M+1 linear equations from the inner products, wherein each linear equation is a function of a respective one of the parameter sets and corresponding parameter variables of the first modulated Gaussian pulse.

87. (New) The method of claim 85, wherein M is greater than or equal to N, and wherein said determining the N parameter variables comprises overdetermining the N parameter variables of the Gaussian pulse by solving the M+1 linear equations, wherein the overdetermined parameters characterize the Gaussian pulse.

88. (New) The method of claim 87, wherein N = 3, and wherein the N parameters comprise inverse variance α_p, time shift t_p, and carrier frequency ω_t.

89. (New) The method of claim 87, wherein said generating a coarse estimate set of N parameters for the first modulated Gaussian pulse comprises:

a) determining a current area of interest of the received signal, wherein the current area of interest comprises a second sequence of values which includes at least a portion of the first sequence of values, and wherein the current area of interest comprises a start position and an end position;

b) selecting a current Gaussian window from a plurality of Gaussian windows, wherein the current Gaussian window comprises a third sequence of values representing a Gaussian waveform;

c) performing a windowed Fast Fourier Transform (FFT) using the selected Gaussian window and the determined area of interest to generate a power spectrum;

Cont. a6

d) identifying a peak frequency amplitude from the power spectrum;

e) repeating a) through d) in an iterative manner until each of the plurality of Gaussian windows has been selected, thereby generating a plurality of peak frequency amplitudes;

f) identifying a maximum peak frequency amplitude from said plurality of peak frequency amplitudes; and

g) selecting an estimation Gaussian window from the plurality of Gaussian windows corresponding to said identified maximum peak frequency amplitude, wherein said coarse estimate set of N parameters of the Gaussian pulse is determined from the estimation Gaussian window.

90. (New) The method of claim 89, wherein said performing a windowed Fast Fourier Transform (FFT) using the selected Gaussian window and the determined area of interest comprises:

logically aligning the Gaussian window at the start position of the area of interest, wherein a sub-sequence of the values comprised in the area of interest aligns with the third sequence of values comprised in the Gaussian window;

performing an element-wise multiplication of the third sequence of values and the sub-sequence of values to generate a product waveform; and

applying a Discrete Fourier Transform to the product waveform to generate the power spectrum.

91. (New) The method of claim 89, wherein the respective lengths of the second sequence of values and the third sequence of values are each a power of two.

92. (New) The method of claim 89, wherein the length of the second sequence of values is twice the length of the third sequence of values.

Cont A6

93. (New) The method of claim 77, wherein said one or more reflected pulses are generated by the Device Under Test (DUT) reflecting at least a portion of the initial modulated Gaussian pulse; and

wherein said refined set of parameters characterizing the Gaussian pulse and the one or more reflected Gaussian pulses are useable to characterize a connection discontinuity in the DUT.

94. (New) The method of claim 77, further comprising performing the following steps prior to said receiving the signal:

generating the initial modulated Gaussian pulse and transmitting the initial modulated Gaussian pulse to a digitizer and the Device Under Test (DUT);

the DUT reflecting at least a portion of the transmitted Gaussian pulse to the digitizer in response to said transmitting, wherein said at least a portion of the transmitted Gaussian pulse comprises the one or more reflected Gaussian pulses; and

the digitizer receiving and digitizing the signal comprising the transmitted initial modulated Gaussian pulse and the one or more reflected Gaussian pulses in response to said reflecting.

95. (New) The method of claim 94, further comprising storing the digitized signal in response to said receiving and digitizing.

96. (New) The method of claim 77, wherein said characterizing a first modulated Gaussian pulse in the signal comprises:

generating a coarse estimate set of N parameters for the first modulated Gaussian pulse, wherein N is greater than or equal to one;

generating M permutations of the coarse estimate set of parameters, wherein M is greater than or equal to N-1, wherein said coarse estimate set and said M permutations of

the coarse estimate set comprise M+1 parameter sets, and wherein each parameter set corresponds to an estimation waveform; and

determining a refined set of N parameter values using the M+1 parameter sets, wherein the refined set of parameters characterizes the first modulated Gaussian pulse.

Cont. G6

97. (New) The method of claim 96, wherein said determining a refined set of N parameter values using the M+1 parameter sets comprises:

generating M+1 linear equations from the M+1 parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the first modulated Gaussian pulse; and

determining values of the N parameter variables by solving the M+1 linear equations, wherein the determined parameter variables characterize the first modulated Gaussian pulse.

98. (New) The method of claim 97, wherein said generating M+1 linear equations from the parameter sets comprises:

generating M+1 closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating M+1 linear equations from the inner products, wherein each linear equation is a function of a respective one of the parameter sets and corresponding parameter variables of the first modulated Gaussian pulse.

99. (New) The method of claim 97, wherein M is greater than or equal to N, and wherein said determining the N parameter variables comprises overdetermining the N parameter variables of the Gaussian pulse by solving the M+1 linear equations, wherein the overdetermined parameters characterize the Gaussian pulse.

100. (New) A memory medium operable to store program instructions to analyze a signal, wherein the signal comprises a first sequence of values, and wherein the signal

comprises an initial modulated Gaussian pulse and one or more reflected modulated Gaussian pulses, wherein said program instructions are executable to perform:

characterizing a first modulated Gaussian pulse in the signal, wherein said characterizing a first modulated Gaussian pulse in the signal comprises:

generating a coarse estimate set of N parameters for the first modulated Gaussian pulse, wherein N is greater than or equal to one;

Cont. A6

generating a plurality of permutations of the coarse estimate set of parameters, wherein said plurality of permutations of the coarse estimate set comprises a plurality of parameter sets, and wherein each parameter set corresponds to an estimation waveform; and

determining a refined set of N parameter values using the plurality of parameter sets, wherein the refined set of parameters characterizes the first modulated Gaussian pulse; and

analyzing the characterized first modulated Gaussian pulse to determine characteristics of a Device Under Test (DUT).

101. (New) The memory medium of claim 100,

wherein said determining a refined set of N parameter values using the plurality of parameter sets comprises:

generating a plurality of linear equations from the plurality of parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and at least a subset of the N parameter variables of the Gaussian pulse; and

determining the N parameter variables of the Gaussian pulse by solving the plurality of linear equations, wherein the determined parameters characterize the Gaussian pulse.

102. (New) The memory medium of claim 101,

wherein said generating a plurality of permutations comprises generating M permutations of the estimation of the N parameters, and wherein the M permutations comprise M parameter sets corresponding to M estimation waveforms;

wherein said generating the plurality of linear equations comprises generating the plurality of linear equations from at least a subset of the M parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the Gaussian pulse;

wherein said determining the N parameter variables of the Gaussian pulse comprises solving the plurality of linear equations, wherein the determined parameters characterize the Gaussian pulse.

Cont. A6

103. (New) The memory medium of claim 102,

wherein said generating the plurality of linear equations comprises generating at least M linear equations from the M parameter sets.

104. (New) The memory medium of claim 55, wherein said generating the plurality of linear equations from the plurality of parameter sets comprises:

generating a plurality of closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating the plurality of linear equations from the plurality of inner products, wherein each linear equation is a function of a respective one of the plurality of parameter sets and corresponding N parameter variables of the Gaussian pulse.

105. (New) The memory medium of claim 104,

wherein said generating a plurality of permutations comprises generating M permutations of the estimation of the N parameters, and wherein the M permutations and the estimation comprise M+1 parameter sets corresponding to M+1 estimation waveforms;

wherein said generating a plurality of linear equations comprises generating M+1 linear equations from the M+1 parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the Gaussian pulse;

wherein said determining the N parameter variables of the Gaussian pulse comprises solving the M+1 linear equations, wherein the determined parameters characterize the Gaussian pulse.

106. (New) The memory medium of claim 105, wherein said generating M+1 linear equations from the M+1 parameter sets comprises:

cont. a6

generating M+1 closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating M+1 linear equations from the M+1 inner products, wherein each linear equation is a function of a respective one of the M+1 parameter sets and corresponding N parameter variables of the Gaussian pulse.

107. (New) The memory medium of claim 106, wherein M = N – 1.

108. (New) The memory medium of claim 105, wherein said determining a refined set of N parameter values using the plurality of parameter sets comprises:

generating M+1 linear equations from the M+1 parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the first modulated Gaussian pulse; and

determining values of the N parameter variables by solving the M+1 linear equations, wherein the determined parameter variables characterize the first modulated Gaussian pulse.

109. (New) The memory medium of claim 108, wherein said generating M+1 linear equations from the parameter sets comprises:

generating M+1 closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating M+1 linear equations from the inner products, wherein each linear equation is a function of a respective one of the parameter sets and corresponding parameter variables of the first modulated Gaussian pulse.

110. (New) The memory medium of claim 108, wherein M is greater than or equal to N, and wherein said determining the N parameter variables comprises overdetermining the N parameter variables of the Gaussian pulse by solving the M+1 linear equations, wherein the overdetermined parameters characterize the Gaussian pulse.

Cont. a6

111. (New) The memory medium of claim 110, wherein N = 3, and wherein the N parameters comprise inverse variance α_p, time shift t_p, and carrier frequency ω_f.

112. (New) The memory medium of claim 100, wherein said generating a coarse estimate set of N parameters for the first modulated Gaussian pulse comprises:

a) determining a current area of interest of the received signal, wherein the current area of interest comprises a second sequence of values which includes at least a portion of the first sequence of values, and wherein the current area of interest comprises a start position and an end position;

b) selecting a current Gaussian window from a plurality of Gaussian windows, wherein the current Gaussian window comprises a third sequence of values representing a Gaussian waveform;

c) performing a windowed Fast Fourier Transform (FFT) using the selected Gaussian window and the determined area of interest to generate a power spectrum;

d) identifying a peak frequency amplitude from the power spectrum;

e) repeating a) through d) in an iterative manner until each of the plurality of Gaussian windows has been selected, thereby generating a plurality of peak frequency amplitudes;

f) identifying a maximum peak frequency amplitude from said plurality of peak frequency amplitudes; and

g) selecting an estimation Gaussian window from the plurality of Gaussian windows corresponding to said identified maximum peak frequency amplitude, wherein said coarse estimate set of N parameters of the Gaussian pulse is determined from the estimation Gaussian window.

113. (New) The memory medium of claim 112, wherein said performing a windowed Fast Fourier Transform (FFT) using the selected Gaussian window and the determined area of interest comprises:

logically aligning the Gaussian window at the start position of the area of interest, wherein a sub-sequence of the values comprised in the area of interest aligns with the third sequence of values comprised in the Gaussian window;

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performing an element-wise multiplication of the third sequence of values and the sub-sequence of values to generate a product waveform; and

applying a Discrete Fourier Transform to the product waveform to generate the power spectrum.

114. (New) The memory medium of claim 112, wherein the respective lengths of the second sequence of values and the third sequence of values are each a power of two.

115. (New) The memory medium of claim 112, wherein the length of the second sequence of values is twice the length of the third sequence of values.

116. (New) The memory medium of claim 100, wherein said one or more reflected pulses are generated by the Device Under Test (DUT) reflecting at least a portion of the initial modulated Gaussian pulse; and

wherein said refined set of parameters characterizing the Gaussian pulse and the one or more reflected Gaussian pulses are useable to characterize a connection discontinuity in the DUT.

117. (New) The memory medium of claim 100, wherein, prior to said receiving the signal, said program instructions are executable to perform:

generating the initial modulated Gaussian pulse and transmitting the initial modulated Gaussian pulse to a digitizer and the Device Under Test (DUT);

the DUT reflecting at least a portion of the transmitted Gaussian pulse to the digitizer in response to said transmitting, wherein said at least a portion of the transmitted Gaussian pulse comprises the one or more reflected Gaussian pulses; and

the digitizer receiving and digitizing the signal comprising the transmitted initial modulated Gaussian pulse and the one or more reflected Gaussian pulses in response to said reflecting.

118. (New) The memory medium of claim 117, wherein said program instructions are further executable to perform:

storing the digitized signal in response to said receiving and digitizing.

119. (New) The memory medium of claim 100, wherein said characterizing a first modulated Gaussian pulse in the signal comprises:

generating a coarse estimate set of N parameters for the first modulated Gaussian pulse, wherein N is greater than or equal to one;

generating M permutations of the coarse estimate set of parameters, wherein M is greater than or equal to N-1, wherein said coarse estimate set and said M permutations of the coarse estimate set comprise M+1 parameter sets, and wherein each parameter set corresponds to an estimation waveform; and

determining a refined set of N parameter values using the M+1 parameter sets, wherein the refined set of parameters characterizes the first modulated Gaussian pulse.

120. (New) The memory medium of claim 119, wherein said determining a refined set of N parameter values using the M+1 parameter sets comprises:

generating M+1 linear equations from the M+1 parameter sets, wherein each linear equation is a function of a respective one of the parameter sets and corresponding N parameter variables of the first modulated Gaussian pulse; and

determining values of the N parameter variables by solving the M+1 linear equations, wherein the determined parameter variables characterize the first modulated Gaussian pulse.

121. (New) The memory medium of claim 120, wherein said generating M+1 linear equations from the parameter sets comprises:

generating M+1 closed form inner products, wherein each closed form inner product is generated between the received signal and each estimation waveform; and

generating M+1 linear equations from the inner products, wherein each linear equation is a function of a respective one of the parameter sets and corresponding parameter variables of the first modulated Gaussian pulse.

cont'd A6

122. (New) The memory medium of claim 120, wherein M is greater than or equal to N, and wherein said determining the N parameter variables comprises overdetermining the N parameter variables of the Gaussian pulse by solving the M+1 linear equations, wherein the overdetermined parameters characterize the Gaussian pulse.

REMARKS

The paragraphs on page 8 at lines 11 and 13 were replaced to correct the brief descriptions of the drawings.

Claims 42, 46, 66, and 70 have been amended. Claims 77-122 have been added.